47-1

本試題雙面印刷

1. The steel rod shown in Figure 1 has a diameter of 4 mm. It is attached to the fixed wall at A, and before it is loaded, there is a gap between the wall at B' and the rod of 1 mm. Determine the reactions at A and B' if the rod is subjected to an axial force of $P = 20$ kN as shown. Neglect the size of the collar at C. Assume $E_{steel} = 200$ GPa.
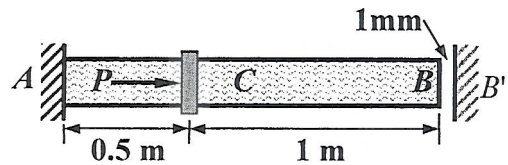

Figure 1

2. A simply supported beam of rectangular cross section is subjected to a concentrated load $P = 10$ kN at its midspan as shown in Figure 2. Calculate the principal stresses at points A, B, C, D, and E of the beam.
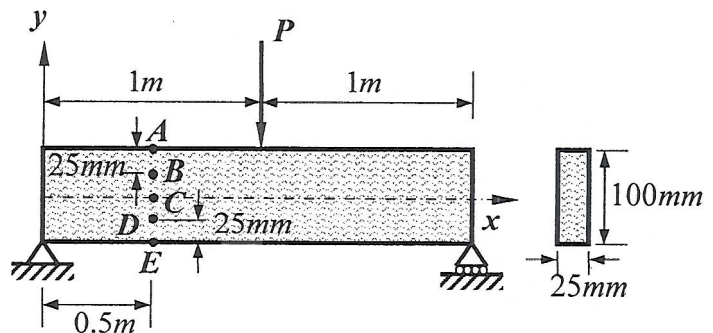

Figure 2

背面尚有試題

3. The cantilever beam AB has a uniform load of intensity q acting over part of its length as shown in Figure 3. Determine the deflection δ_B and the angle of rotation θ_B at the free end. EI is constant.
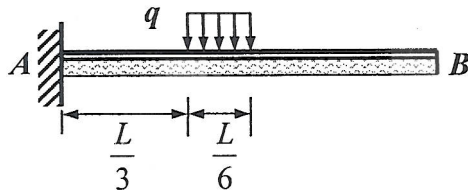
Hint:

$$\delta_B = \frac{Pa^2}{6EI}(3L-a), \ \theta_B = \frac{Pa^2}{2EI}$$

Figure 3

4. A steel shaft is to transmit 3.7 kW of power while rotating at a frequency of 60 Hz. Determine the shaft diameter which should be used if the shearing stress is not to exceed 50 MPa.